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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,571	JANSSEN, WLADIMIR	
	Examiner	Art Unit	
	ALBERT HILTON	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is a first action on the merits. Claims 1-26 are pending. Claim 4 has been canceled by the applicant.

Drawings

2. Objections to the drawings are withdrawn in view of the submitted replacement drawings.

Claim Rejections - 35 USC § 112

3. The rejection of claims 5, 8, 10-13, and 15 under 35 USC § 112 second paragraph, for insufficient antecedent basis, are withdrawn in view of the amended claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 5, 10, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES (US Patent No. 4801086) in view of WICHMANN (US Patnent No. 5209410), MESTON (US Patent No. 2097233), and DANIEL (US Patent No. 4790155).

4. Regarding claim 1, NOAKES describes an electrostatic spray system comprising members (**electrodes 51**, **53**) and parallel flow distribution modules (**plates 45**, **49**) made from non conductive materials that are held in contact with each other (Fig. 4), the parallel flow distribution modules (**45**, **47, 49**) are positioned at two outside surfaces of a vertical member (**plate 47**) for providing parallel spray (column 5, lines 41-50 and Fig. 9); a conductive surface (**electrodes 51**, **53**) that is part of the vertical member (in Fig. 9, the conductive surfaces (**50**, **53**) are part of the modules (**45**, **49**) rather than the member (**47**). However, NOAKES also shown an embodiment in Fig. 8 in which the member (**electrode 51**) is a part of the member (**47**)) and that faces a flow distribution module (**45**, **49**) and is maintained at a voltage of a minimum of 20,000 volts (column 5, lines 43-47, column 4, lines 52-57, and Fig. 9), wherein each of the flow distribution modules (**45**, **49**) is supplied by a controlled flow of a flowable material (**liquids A**, **B**) (column 3, lines 63-66 and Fig. 9), and wherein the flow distribution modules (**45**, **49**) can be given different dimensions and can be positioned to give various spray configurations (column 1, lines 51-54, column 2, lines 3-7, and Figs. 6-13).

5. NOAKES does not describe target bars that define electrostatic fields. However, WHICTMANN teaches that target bars (**inductor bars 42**) can be placed so as to guide the flow of material in an electrospray apparatus (WHICTMANN: column 5, lines 45-53,

and Fig. 2). While WHITMANN does not specify the use of target bars having high and low parts to create distinctive fields. However, MESTON teaches that the shape of an electrode surface influences the direction and concentration of charged particles that are sprayed via electrospray, and that this effect can be used to spray material in a pattern (MESTON: column 1, lines 50-55 to column 2, lines 1-20). MESTON describes the said pattern can be created through the use of high and low parts (**curvature**, **ridges**, **points**) that shape the electric field around said electrode (MESTON: column 2, lines 4-14). One of ordinary skill in the art at the time of the invention, motivated by a need to guide the material sprayed from the apparatus of NAOKES so as to create a pattern, would therefore have found it *prima facie* obvious to add the target bars of WHICTMANN to the apparatus of NOAKES, and further to fashion said target bars with high and low parts.

6. Further regarding claim 1, NOAKES does not describe the use of a catch-pan. However, it was well-known in the art at the time, as taught by DANIEL, to make use of a catch-pan (**catch-pan 16**) in an spraying apparatus in order to collect excess sprayed material (DANIEL: column 4, lines 55-58 and Fig. 2). One of ordinary skill in the art at the time of the invention, needing to prevent the area from being contaminated by excess sprayed material, would therefore have found it *prima facie* obvious to add the catch-pan of DANIEL to the apparatus of NOAKES.

7. Regarding claim 5, NOAKES in view of WICHMANN, MESTON, and DANIEL teaches an electronic spray apparatus in which sprayed material can be guided to follow curved contour through the use of an electrode that shapes an electric field around

(MESTON: column 1, lines 51-55 to column 2, lines 1-3). MESTON further teaches that patterns of material can be deposited with an equal depth on a surface by establishing an electric field that is perpendicular to shape of the coating surface (MESTON: column 3, lines 16-22). One of ordinary skill in the art at the time of the invention, needing to coat an object with a curved surface, would have found it *prima facie* obvious to make use of a curved electrode in the apparatus of the combined references, with the reasonable expectation that such an electrode would evenly coat the surface.

8. Regarding claim 10, the conductive surface of NOAKES comprises a charging strip (**electrode 50**) that imparts a conductive charge, is solid and thin, and is covered by flow distribution modules (**plate 49**) (NOAKES: column 5, lines 48-53 and Figs. 8-9).

9. Regarding claim 22, NOAKES in view of WICHMANN, MESTON, and DANIEL does not explicitly specify that the electrospray system is an automated system controlled by a computer system. However, broadly providing an automated means to perform a manual task is insufficient to distinguish the claim from the prior art in a patentably distinct way (See MPEP 2144.04, and *In re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)).

10. Regarding claim 24, NOAKES in view of WICHMANN, MESTON, and DANIEL does not indicate that the atomization process takes place in a vacuum. One of ordinary skill in the art would readily appreciate that the claimed apparatus of the combined references could operate in ambient air, and would therefore inherently incorporate a gas such as air into the atomization process.

11. **Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5 10, 22, and 24 above, and in further view of SEAVER (US Patent No. 5326598).**

12. Regarding claim 16, NOAKES in view of WICHMANN, MESTON, and DANIEL an apparatus that sprays flowable material onto a belt (conveyor 160) (WICHMANN: column 10, lines 5-6), but does not specify that the belt is a web material. However, the use of an electrospray apparatus to spray material onto a movable web is well-known in the art, as exemplified by SEAVER, in which an electrospray apparatus (coating head system 10) sprays material onto a traveling web material (43) (SEAVER: Fig. 8 and column 11, lines 22-25). One of ordinary skill in the art would have found it obvious that the belt disclosed in WICHMANN could refer to a belt on which a web material is transferred.

13. Regarding claim 17, NOAKES in view of WICHMANN, MESTON, and DANIEL discloses an apparatus that sprays flowable material onto a belt (conveyor 160) (WICHMANN: column 10, lines 5-6), but does not disclose the use of two spray assemblies or a web which is guided by rollers in an S configuration. However, the use of two spray apparatuses represents a mere duplication of parts that does not distinguish the instant application form the prior art in a patentably distinct way (See MPEP 2144.04, and *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)). Furthermore, the use of rollers in an S configuration is a well-known solution in the art to the problem of transporting a traveling web of material, as exemplified by SEAVER (SEAVER, Fig. 8). One of ordinary skill in the art would therefore have found it obvious

to guide the web material on rollers in an S configuration, and to provide two spray apparatuses.

14. Regarding claim 18, NOAKES in view of WICHMANN, MESTON, and DANIEL discloses an apparatus that sprays flowable material onto a belt (conveyor 160) (WICHMANN: column 10, lines 5-6). As noted above, the use of multiple spray assemblies and the use of rollers to guide the web material in an S configuration fails to patentably distinguish the invention form the prior art. The use of rollers in a C configuration represents a mere rearrangement of parts, and does not distinguish the instant application form the prior art in a patentably distinct way (See MPEP 2144.04, and *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950)).

Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and in further view of MAIER (US Patent No. 5332154).

Regarding claim 2, NOAKES in view of WICHMANN, MESTON, and DANIEL teaches a flow distribution module, but does not teach the use of several rows of flow distribution modules. However, MAIER teaches that a plurality a flow modules (**nozzles**) can be stacked in parallel, and in a variety of geometries (MAIER: column 6, lines 41-46, column 10, lines 28-34, and Fig. 3). When the modules are stacked in parallel, as in Fig. 3, the flow distribution modules (**members 12**, **32**, **bottom 40**) are positioned in between parallel members (**nozzle tip 18**) (MAIER: column 4, lines 54-63, column 5, lines 1-3, and Fig. 3). MAIER further teaches that it is desirable to increase the flow rate of electrospray devices (MAIER: column 1, lines 25-31). One of ordinary skill in the art

at the time of the invention would therefore have found it *prima facie* obvious to make use of the stacked arrangement of MAIER in the apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL, with the reasonable expectation that such an arrangement would advantageously increase the flow rate of the apparatus.

15. Regarding claim 3, WICHMANN teaches that an electrospray apparatus can be given a variety of embodiments, including a plurality of flow distribution modules (**nozzle 25**, **front member 70**, **rear member 90**, **and shim 112**) that are assembled to a desired spray length, and can be configured in different dimensions (WICHMANN: column 2, lines 35-42 and column 10, lines 28-46). NOAKES teaches the use of apparatuses having multiple flow modules (**plates 31-34**) (NOAKES: column 5, lines 7-23 and Fig. 6) and apparatuses supplied with different flowable materials (column 5, lines 7-9, Fig. 6) that are capable of being supplied with different flow rates. One of ordinary skill in the art at the time of the invention, appraised of the teachings of WICHMANN and NOAKES, would therefore have found it *prima facie* obvious that the apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL could be assembled with a plurality of flow distribution modules assembled to a desired spray length, and could be configured in different dimensions in which flowable materials are submitted to the flow distribution modules, in which the flow distribution modules have different dimensions, in which different flow rates are used for multiple flow distribution modules.

16. **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and further in view of SUGIYAMA (US Patent No. 5803371).**

17. Regarding claim 6, NOAKES in view of WICHMANN, MESTON, and DANIEL do not teach the use of a distribution module containing a distribution groove that is directly connected to each of a number of smaller parallel grooves aligned in the direction of the electrostatic field and that are distributed over the width of the a flow distribution module. However, SUGIYAMA describes the use of a distribution module (**injection nozzle 10**) containing a distribution groove (**inlet passage 16**) that is directly connected to each of a number of smaller parallel grooves (**grooves 17**) distributed over the width of the flow distribution module (**10**) (SUGIYAMA: column 3, line 19, column 4, lines 29-33, and Fig. 1), and teaches that the use of parallel grooves in a nozzle (**10**) improves the injection speed of the fluid material (SUGIYAMA: column 1, lines 18-27). One of ordinary skill in the art at **t**he time of the invention, motivated by a need to improve the injection speed of the apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL, would have found it *prima facie* obvious to incorporate the grooved nozzle design of SUGIYAMA into the apparatus of the combined references.

18. **Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, DANIEL, and SUGIYAMA as applied to claim 6 above, and further in view of MAIER.**

19. Regarding claim 13, NOAKES in view of WICHMANN, MESTON, DANIEL, and SUGIYAMA teaches a distribution module (**injection nozzle 10**) having an inlet (**inlet**

passage 16) and a line of grooves (**grooves 17**) having a feed line (**injection passages 17a**) (SUGIYAMA: column 3, line 19, column 4, lines 29-37, and Fig. 1), but does not explicitly show that the inlet is located below the grooves. However, it was known in the art at the time of the invention, as taught my MAIER, that it is often desirable to orient a distribution module upward in order to spray the underside of a coating object (MAIER: column 1, lines 25-31 and Fig. 9). One of ordinary skill in the art at the time, desiring to coat the underside of an object, would therefore have found it *prima facie* obvious to orient the distribution upward, resulting in an apparatus in which the inlet passage is located below the feed line of the grooves.

Claims 7-9, 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and further in view of MILLER (US Patent No. 2695002).

20. Regarding claim 7, the electrospray apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL describes an inlet for liquids (**inlet pipe 13**, **15**) (NOAKES: column 3, lines 63-66), but does not explicitly describe a flowable material supply system that can operate continuously and can supply the fluid distribution modules with controlled flows. However, WHICMANN teaches the use of a flowable material supply system (**source of the flowable material**, **valve 124**) in which material can be supplied to individual distribution chambers to control the dispensing process, (WHICMANN: column 3, lines 38-43, column 9, lines 6-13). One of ordinary skill in the art at the time of the invention, motivated by a need to control the flow of material into

the apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL would therefore have found it *prima facie* obvious to add the material supply system of WHICMANN into the apparatus of the combined references.

21. Further regarding claim 7, the combined references do not explicitly teach the use of a means for electrically insulating the flowable material supply system. however, it is known in the art, as taught by MILLER that the material supply system of an electrospray apparatus must be kept electrically insulated if a material with a high conductivity is to be sprayed (MILLER: column 4, lines 71-77). One of ordinary skill in the art at the time of the invention, desiring to spray a material with a high conductivity, would therefore have found it *prima facie* obvious to provide a means for electrically insulating the material supply system of NOAKES in view of WICHMANN, MESTON, and DANIEL.

22. Regarding claims 8 and 9, the combined references do not describe heating the supply system or the members and flow distribution system. However, WICHMANN teaches that the flowable material must often be maintained at an elevated temperature in a spray apparatus (WHICMANN: column 9, lines 51-55), and further notes that the flowable material supply system (material supply plenum 127), members, and flow distribution modules (nozzle assembly 152, 154) can be provided with an insulating canopy for the supply system and an insulating unit for the flow distribution system that are provided with a means for heating or cooling the flowable material (WICHMANN: column 9, lines 46-60). One of ordinary skill in the art at the time of the invention, needing to maintain the flowable material at an elevated temperature, would therefore

have found it *prima facie* obvious to incorporate the heating system of WHICMANN into the apparatus of the combined references. WICHMANN does not specifically teach that the heating/cooling means is a gas or liquid. However, one of ordinary skill in the art would recognize that a temperature-regulated gas or liquid is an obvious design choice for a means of heating or cooling an insulating canopy or unit.

23. Regarding claim 11, WICHMANN discloses that the flowable material supply mechanism for directing flow of material to the flow distribution modules is a pneumatic pressure input (163) controlled by pressure transducers (159) and having a storage sump (164) (WICHMANN column 9, lines 65-68 to column 10, lines 1-6). Such a system would be capable of providing drip-proof flow by reversing the direction of the pressure of the pneumatic pressure input, which would provide reverse suction and direct excess fluid to the sump.

24. Regarding claim 19, the electrospray apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER teaches an electrospray system with a flowable material supply system (**material supply plenum 127**), members, and flow distribution modules (**nozzle assembly 152, 154**) that can be provided with an insulating canopy for the supply system and an insulating unit for the flow distribution system that are provided with a means for heating or cooling the flowable material (WICHMANN: column 9, lines 46-60). After the flowable material, which is heated when in the distribution module and nozzle, has sprayed onto a target, it will come into contact with ambient air which is cooler than the temperature of the heated flowable material. The cooler ambient air will lower the temperature of the flowable material after it has

reached its target. The apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER therefore meets the limitations of claim 19.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER as applied to claims 7-9, 11 and 19 above, and further in view of RANSBURG (US Patent No. 2509277).

25. Regarding claim 12, NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER does not describe the use of a ground switch in which suction is combined with the quick removal of high voltage from the charging switch by means of a ground switch. However, RANSBURG teaches that the use of a ground switch (**switch 35**) associated with the electrode (**electrode 17**) an electrospray device (**spray gun 16**) that, upon activation, shunts the potential of the electrode (**17**) to such that the potential of the electrode (**17**) is equal to that of a grounded spray object (**object 15**) (RANSBURG: column 2, lines 34-41, column 4, lines 18-26, and Fig. 1). RANSBURG further teaches that such a ground switch mechanism prevents hazardous sparking between the electrode (**17**) and the object (**15**) (RANSBURG: column 1, lines 39-42, and column 5, lines 3-17). One of ordinary skill in the art at the time of the invention, needing to prevent sparking in the apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER, would therefore have found it *prima faice* obvious to incorporate the ground switch of RANSBURG into the apparatus of the combined references.

26. **Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER as applied to claims 7-9, 11 and 19 above, and further in view of SHEVETS (US Patent Application 2002/0168297) and HAWKINS (US Patent No. 6158235).**

27. Regarding claims 14, NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER discloses the use of a pneumatic pressure input (163) (WICHMANN: column 10, lines 1-6), but does not disclose a pump that is a precise stacked metering pump with a precisely controlled motor to supply a number of flow distribution modules over the length of a spray assembly. However, the use of precision metering pumps in electrospray apparatuses is a well-known technique in the art, as shown, for example, in SHEVETS. In SHEVETS, a syringe pump (10) in conjunction with an elastomer membrane (5) supplies fluid to an electrospray tip (16) (SHEVETS: Fig. 3 and paragraphs 5). The fluid output of the pump of SHEVETS is a precision metering pump (SHEVETS: paragraph 35 and 88). WICHMANN notes that one of the objects of WICHMANN's invention is to dispense material to a target in a predetermined controlled and uniform rate of application WICHMANN: column 3, lines 3-15). One of ordinary skill in the art at the time of the invention would have found it obvious to use a pump of the kind disclosed in SHEVETS to provide fluid material to the electrospray apparatus of the combined references, with the expected result that such an addition would enhance the control of the fluid dispensed by the apparatus. Neither WICHMANN nor SHEVETS discloses the use of stacked pumps. However, it is known in the art, as taught by HAWKINS, that stacked pumps can be used when limited space is available

(HAKWINS: column 8, lines 3-4 and Fig. 8). One of ordinary skill in the art, desiring to minimize the space occupied by the apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER, would have found it *prima facie* obvious to stack the apparatus' metered pumps.

28. Regarding claim 15, the apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, MILLER, and SHEVETS teaches outlet lines (**supply lines 123**) provided with valves (**valves 124**) connected to the pump that can supply individual flow distribution modules with flowable material (WICHMANN: column 9, lines 6-16 and Fig. 2).

29. **Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and in further view of MILLER '354 (US Patent No. 5516354).**

30. Regarding claim 20, **NOAKES in view of WICHMANN, MESTON, and DANIEL** does not disclose a spray system in which the area on the lips where ligament flow occurs is illuminated and a video camera is used to count the ligaments. However, the use of a camera to analyze the flow from an electrospray apparatus is known in the art, as exemplified by MILLER '354, which discloses an electrospray apparatus (2) with a window (42) and an optical sensor (5) for generating and image of the spray (MILLER '354: column 5, lines 21-30 and Fig. 2). MILLER '354 further suggests that a CID or CCD camera would be a suitable sensor (MILLER '354: column 5, lines 24-26). MILLER '354 does not specifically disclose an illumination source, but some source of illumination would have to be present inherently in order for the optical sensor to

function. One of ordinary skill in the art would have found it obvious to add the CID or CCD camera taught in MILLER '354 to the electrospray apparatus of the combined references, with the expected result that such an addition would allow for the spray characteristics to be monitored.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER '354 as applied to claim 20 above, and further in view of RANSBURG.

31. Regarding claim 21, NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER '354 does not describe the use of a ground switch in which suction is combined with the quick removal of high voltage from the charging switch by means of a ground switch. However, RANSBURG teaches that the use of a ground switch (**switch 35**) associated with the electrode (**electrode 17**) an electrospray device (**spray gun 16**) that, upon activation, shunts the potential of the electrode (**17**) to such that the potential of the electrode (**17**) is equal to that of a grounded spray object (**object 15**) (RANSBURG: column 2, lines 34-41, column 4, lines 18-26, and Fig. 1). RANSBURG further teaches that such a ground switch mechanism prevents hazardous sparking between the electrode (**17**) and the object (**15**) (RANSBURG: column 1, lines 39-42, and column 5, lines 3-17). One of ordinary skill in the art at the time of the invention, needing to prevent sparking in the apparatus of NOAKES in view of WICHMANN, MESTON, DANIEL, and MILLER '354, would therefore have found it *prima faice* obvious to incorporate the ground switch of RANSBURG into the apparatus of the combined references.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and in further view of OLBRANT (US Patent No. 3775806).

32. Regarding claim 23, NOAKES in view of WICHMANN, MESTON, and DANIEL does not disclose the use of a dust removal device prior to the electrospray application of fluid material. However, it is well known in the art that it is often advantageous to remove dust from a traveling material prior to coating the material with a fluid material, as is taught in OLBRANT (OLBRANT: column 1, lines 22- 36). One of ordinary skill in the art would have readily appreciated that the removal of dust from a web material is a problem with well-known solutions in the art, and would have therefore found it obvious to add the dust removal apparatus of OLBRANT to the spray apparatus of the combined referecens, with the predictable result that such a combination would improve the coating process by removing dust from the web surface.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN, MESTON, and DANIEL as applied to claims 1, 5, 10, 22, and 24 above, and in further view of WHITEHOUSE (US Patent No. 5306412).

33. Regarding claim 25, NOAKES in view of WICHMANN, MESTON, and DANIEL does not disclose the use of mechanical energy to affect the spray characteristics. However, it is known in the art, as taught by WHITEHUOSE, that the use of a mechanical actuator (**transducer 160**) in an electrospray apparatus enhances the breakup of the liquid into droplets (WHITEHOUSE: column 3, lines 59-68 t, column 12,

lines 26-37, and Fig. 11). One of ordinary skill in the art at the time of the invention, motivated by a desire to improve the spray characteristics in the apparatus of the combined references, would therefore have found it *prima facie* obvious to incorporate the mechanical actuator of WHITEHOUSE into the apparatus of the combined references.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over NOAKES in view of WICHMANN , DANIEL, SUGIYAMA, and MAIER.

34. Regarding claim 26, NOAKES discloses an electrostatic flow distribution and charging system comprising an assembly of more than one insulated non-conducting modules (**45**, **47, 49**), a conductive surface (**electrodes 51**, **53**) with an electrical connection to said surface (column 5, lines 41-50 and Figs. 4, 9) whereby the flowable material is electrically insulated except for said conductive surface and electrical connection (NOAKES: column 5, lines 41-47), thereby minimizing the loss from electric currents through the assembly, a means for applying an electrostatic field (**51**, **53**). NOAKES does not describe target bars that define electrostatic fields. However, WHICTMANN teaches that target bars (**inductor bars 42**) can be placed so as to guide the flow of material in an electrospray apparatus (WHICTMANN: column 5, lines 45-53, and Fig. 2). One of ordinary skill in the art at the time of the invention, motivated by a need to guide the material sprayed from the apparatus of NAOKES so as to create a pattern, would therefore have found it *prima facie* obvious to add the target bars of WHICTMANN to the apparatus of NOAKES.

35. Further regarding claim 26, the NOAKES in view of WICHMANN, and DANIEL do not teach the use of a distribution module containing a distribution groove that is directly connected to each of a number of smaller parallel grooves aligned in the direction of the electrostatic field and that are distributed over the width of the a flow distribution module. However, SUGIYAMA discribes the use of a distribution module (**injection nozzle 10**) containing a distribution groove (**inlet passage 16**) that is directly connected to each of a number of smaller parallel grooves (**grooves 17**) distributed over the width of the flow distribution module (**10**) (SUGIYAMA: column 3, line 19, column 4, lines 29-33, and Fig. 1), and teaches that the use of parallel grooves in a nozzle (**10**) improves the injection speed of the fluid material (SUGIYAMA: column 1, lines 18-27). One of ordinary skill in the art at **t**he time of the invention, motivated by a need to improve the injection speed of the apparatus of NOAKES in view of WICHMANN, and DANIEL, would have found it *prima facie* obvious to incorporate the grooved nozzle design of SUGIYAMA into the apparatus of the combined references.

36. Further regarding claim 26, electrostatic fields provides a force to cause material to flow through grooves (**grooves 17**) in the NOAKES in view of WICHMANN, and DANIEL. NOAKES in view of WICHMANN, MESTON, and DANIEL teaches a flow distribution module, but does not teach the use of several rows of flow distribution modules. However, MAIER teaches that a plurality a flow modules (**nozzles**) can be stacked in parallel, and in a variety of geometries (MAIER: column 6, lines 41-46, column 10, lines 28-34, and Fig. 3). When the modules are stacked in parallel, as in Fig. 3, the flow distribution modules (**members 12**, **32**, **bottom 40**) are positioned in

between parallel members (**nozzle tip 18**) (MAIER: column 4, lines 54-63, column 5, lines 1-3, and Fig. 3). MAIER further teaches that it is desirable to increase the flow rate of electrospray devices (MAIER: column 1, lines 25-31). One of ordinary skill in the art at the time of the invention would therefore have found it *prima facie* obvious to make use of the stacked arrangement of MAIER in the apparatus of NOAKES in view of WICHMANN, MESTON, and DANIEL, with the reasonable expectation that such an arrangement would advantageously increase the flow rate of the apparatus.

37. Further regarding claim 26, the combined references do not describe the use of a catch-pan. However, it was well-known in the art at the time, as taught by DANIEL, to make use of a catch-pan (**catch-pan 16**) in an spraying apparatus in order to collect excess sprayed material (DANIEL: column 4, lines 55-58 and Fig. 2). One of ordinary skill in the art at the time of the invention, needing to prevent the area from being contaminated by excess sprayed material, would therefore have found it *prima facie* obvious to add the catch-pan of DANIEL to the apparatus of the combined references.

Response to Arguments

38. Applicant has requested clarification as to the legal precedents relied upon for rejections. References to precedents relied on have been added in the rejections of claims 17, 18, and 22 above. Specific cases referenced in the present action are: *in re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958); *in re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960); and *in re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

39. Applicant argues that the amended claim 1, which allows for parallel spray, is not anticipated by WICHMANN. The parallel spray limitation is taught by NOAKES, as detailed in this action above.

40. Applicant argues that the amended claim 1, which recites high and low parts are used to shape electric fields and thereby define a spray pattern, is not met by the inductor bars of WICHMANN. The use of shaped electrodes to direct the spray pattern of a sprayed material in an electrospray apparatus is known in the art, and is taught by MESTON, as detailed in this action above.

41. Applicant argues that amended claim 5, which recites an electrostatic following a curved contour is not taught by WICHMANN. The use of a curved electrostatic field to direct sprayed material is taught in MESTON.

42. Applicant argues that WICHMANN does not teach a means for electrically insulating a flowable material supply system. However, the combination of references WICHMANN in view of MILLER, teach that “[i]f the liquid material has high conducting properties the entire liquid supply system must be insulated." (Miller, Col. 4, lines 75-77), as discussed above.

43. Applicant argues that WICHMANN’s thin conductive charge imparting parts do not anticipate the solid thin conductive charge imparting parts recited in claim 10, as the charge imparting parts of WICHMANN have holes. The term "solid," given its broadest reasonable definition, does not imply that the part in question does not have any holes. The charge imparting parts of WICHMANN would be considered to be “solid” by an ordinary artisan, despite the presence of holes.

44. Applicant argues that the parallel grooves in WICHMANN '336 branch into two separate branches of channels, and are not therefore directly connected as is required in amended claims 6 and 13. This limitation is met by SUGIYAMA, which describes a distribution groove directly connected to parallel groves along the length of the module as detailed above.

45. Applicant argues that the amended claim 12, which recites a ground switch to remove a high voltage, is not anticipated by the combined references. The ground switch limitation is taught by RANSBURG, as detailed above.

46. Applicant argues that it would have been non-obvious to duplicate the metering pumps of SHEVETS for use in the apparatus of WICHMANN due to the impracticality associated with packaging concerns. However, the use of a stacking arrangement to overcome such packaging concerns is known in the art, and is taught by HAWKINS, as described above.

47. Applicant argues that the camera taught by MILLER cannot be combined with WICHMANN, as the camera of MILLER is placed 20-50 mm from the plume, and placing a camera in close proximity to the high-voltage source of MILLER would be unadvisable due to arcing. However, the camera of MILLER is placed behind a window (**42**) (MILLER: column 5, lines 39-42 and Fig. 2). Applicant has not shown that the window of MILLER would not provide enough insulation to adequately protect the camera of MILLER from the voltage supply of the electrospray flume of WICHMANN.

48. Applicant argues that WICHMANN does not teach the transfer of sprayed material from a belt to a web after being sprayed by the apparatus of WICHMANN, or

the use of the apparatus to spray both sides of a web, as is required in claims 16 and 17. The configuration of the web, and the transfer of material to another substrate after spraying both constitute intended uses of the invention that do not alter the structure of the claimed apparatus in a patentably distinct way, as described above.

49. Applicant argues that the combined references do not teach shaped target bears as required by claim 26. The use of shaped electrodes to direct the spray pattern of a sprayed material in an electrospray apparatus is known in the art, and is taught by MESTON, as detailed in this action above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT HILTON whose telephone number is (571)-270-5519. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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